



K. K. Wagh Institute of Engineering Education & Research, Nashik
(An Autonomous Institute From A.Y. 2022-23)

SUMMER-2024	
Exam Seat No.:	
Academic Year:2023-2024	Semester:IV
Class:SY	Program:B.Tech
Branch Code:ADS/COM/CSD	Pattern:2022
Name of Course:Advanced Data Structures	Course Code:COM222012
Max. Marks:60	Duration:2.30 Hrs.

Instructions: Candidates should read carefully the instructions printed on the Question Paper and on the cover page of the Answer Book, which is provided for their use.

1. This question paper contains 2 page(s).
2. Answer to each new question is to be started on a new page.
3. Assume suitable data wherever required, but justify it.
4. Draw the neat labelled diagrams, wherever necessary.
5. The last columns indicates the Course Outcome and level of Blooms Taxonomy of the Question/sub-question.

Question No. 1 Attempt following Question

- 1a) Write Dijkstra's Algorithm for finding the shortest path and Discuss the time and space complexity (6) Co1, CO5 of your algorithm.

Question No. 2 Attempt following Question

- 2a) Draw binary search tree for data 52, 35, 12, 18, 20, 23, 52,55,32,90,19,26. Write and explain the (6) Co1 algorithm to find the largest node in BST.

Question No. 3 Attempt following Question

- 3a) Explain with example LL, LR, RR, RL rotation for AVL tree. (8) CO2

OR

- 3b) Draw a diagram to show different stages during the building of AVL tree for the following sequence (8) CO2 of keys:STA,ADD,LDA,MOV,JMP,TRIM,XCHG,MVI,DIV,NOP,IN,JNZ. In each case show the balance factor of all the nodes and name the type of rotation used for balancing.

- 3c) What is OBST? Given the keys={while,do,if} and Probabilities $p(i) = q(i) = 1/7$ for all i. Compute the (8) CO2 cost of all possible BST and find the OBST

OR

- 3d) Compare and contrast Static and Dynamic Symbol Tables with respect to the following (8) CO2 aspects:Definition and Structure, Memory Allocation, Flexibility and Efficiency, Modification and Scalability

Question No. 4 Attempt following Question

- 4a) What is the hash function ? Explain the different types of hash functions (8) CO3

OR

- 4b) What is collision? What are different collision resolution techniques? Explain any two methods in detail. (8) CO3
- 4c) Given the input {4371, 1323, 6173, 4199, 4344, 9699, 1889} and hash function as $Key \% 10$, show the results for Open addressing using double hashing $h_2(x) = 7 - (x \text{ MOD } 7)$ (8) CO3

OR

- 4d) List different file organizations. State the need of file organizations. List different primitive operations on files. Compare sequential file with index sequential file organization. (8) CO3

Question No. 5 Attempt following Question

- 5a) Write an ADT for a binary heap. Explain (any *three*) different operations on MAX heap in brief with example. (8) CO4

OR

- 5b) What is B tree ? Explain the process for deleting a particular value from B tree with the examples. (8) CO4
- 5c) What will be the array representation of a maxheap with the following insertions? (8) CO4
40, 80, 35, 90, 45, 50, 70

OR

- 5d) Explain the concept of a Trie Tree and discuss its significance in string processing. Provide examples to illustrate its usage and describe one advantage it offers over other data structures for storing and searching strings. (8) CO4

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX